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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,246	01/20/2004	Edward G. Sergoyan	05165.1280	7082

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EXAMINER
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KRAMSKAYA, MARINA

ART UNIT	PAPER NUMBER
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2858

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/759,246

Applicant(s)

SERGOYAN ET AL.

Examiner

Marina Kramskaya

Art Unit

2858

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 August 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-23 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 08/01/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 6, 9, 11, 13, 18, & 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Fathi et al., US 5,648,038.

As per Claim 1, Fathi discloses a thickness measurement system, comprising:

- an electromagnetic cavity resonator (**40** in FIG 3A-3B, **49** in text) having an exposed side;
- a signal decoupler **30** coupled to the cavity resonator **40**;
- an signal amplitude detector **35b** coupled to the decoupler;
- a frequency signal generator **20** coupled to the processing unit **50** and to the decoupler **30** (see FIG. 1);
- a processing unit **50** coupled to the amplitude detector **35b** ; and
- a correlating algorithm (i.e. analysis by processor) correlating a resonant frequency shift (i.e. intrinsic shift, as described in column 4, lines 1-2) detected by the

amplitude detector **35b** to a surface thickness (i.e. property as in column 1, lines 41-44) of a sample being measured (column 4, lines 38-42).

As per Claim 11, Fathi discloses a thickness measurement system, comprising:

- a resonating means for resonating an electromagnetic signal (**40** in FIG 3A-3B, **49** in text), having an exposed side;
- a decoupler means **30** for decoupling signals from the resonating means **40**, and connected to the resonating means **40**, (via connections in FIG. 3A);
- a signal detecting means **35b** for detecting an amplitude of signals from the decoupler means **30**, and connected to the decoupler means (via connections in FIG. 3A);
- a frequency signal generating means **20** for generating frequency signals, coupled to the processing means **50** and the decoupler means **30** (via connections in FIG. 3A); and
- a processing means **50** for processing, coupled to the signal detecting means **35b** (via connections in FIG. 3A), or having;
- correlating means (in **50**, i.e. analysis by processor) for correlating a resonant frequency shift (i.e. intrinsic shift, as described in column 4, lines 1-2) detected by the detecting means **35b** to a surface thickness (i.e. property as in column 1, lines 41-44) of a sample being measured (column 4, lines 38-42).

As per Claims 2 & 13, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above, and further discloses the electromagnetic cavity resonator having a plurality of cavities (cavities: **40a**, **40b**, **40c**; column 5, lines 41-42).

As per Claims 6 & 18, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above, and further discloses the amplitude detector **35b** that detects a power (reflected power, **P<sub>r</sub>**).

As per Claims 9 & 20, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above, and further discloses the processing unit **50** to be a personal computer (COMPUTER in FIG. 3A; column 4, line 42).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 3, 5, 7, 10, 12, 15, 17, 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fathi in view of Little Jr., US 6,359,446.

As per Claims 3 ,12 & 15, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above.

Fathi does not disclose the frequency signal generator in the measurement system to be one of a Gunnplexer or a Gunn Diode.

Little discloses a non-conductive thin film thickness measurement system (see ABS. ), wherein the frequency signal generator is a Gunnplexer (column 4, lines 40-43). Little further discloses the Gunnplexer to be made of a Gunn Diode (column 4, lines 42-43).

Therefore, it would have been obvious to a person of ordinary skill in the art to Gunnplexer frequency signal generator, as taught by Little, in the measurement system of Fathi, because a Gunnplexer is small and efficient (column 4, lines 40-43).

As per Claims 5 & 17, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above.

Fathi does not disclose the amplitude detector that detects a voltage.

Little discloses a measurement system wherein the amplitude detector detects a voltage (column 5, lines 21-24).

Therefore, it would have been obvious to a person of ordinary skill in the art to use the amplitude detector to detect a voltage, as taught by Little, in the measurement system of Fathi, in order to send the voltage signal to the signal processor for analysis of the properties for the test material.

As per Claims 7 & 19, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above.

Fathi does not disclose a DC supply coupled to the frequency generator.

Little discloses a DC supply coupled to the frequency generator (column 6, lines 7-11).

Therefore, it would have been obvious to a person of ordinary skill in the art to use a DC power supply coupled to the frequency generator, as taught by Little, in the measurement system of Fathi, in order to deliver power to the frequency generator (column 6, lines 10-11).

As per Claim 8, Fathi discloses the thickness measurement system as applied to Claim 1 above.

Fathi does not disclose a varactor DC supply capable of controlling a frequency generator output frequency.

Little discloses using a varactor (column 4, lines 46-48) DC supply (column 4, lines 59-60) capable of controlling (i.e. tuning) a frequency generator (Gunnplexer) output frequency.

Therefore, it would have been obvious to a person of ordinary skill in the art to use a varactor, as taught by Little, in the measurement system of Fathi, in order to tune the frequency generator, in the instant case a Gunnplexer.

Regarding claims 10 & 21, hereafter, based on the specification, the examiner interprets the “natural resonant frequency” to be the preset frequency of the frequency generator at approximately 10.6 GHz.

As per Claims 10 & 21, Fathi discloses the thickness measurement system as applied to Claims 1 & 11 above.

Fathi does not disclose the cavity resonator to be resonant at a natural frequency of approximately 10.6 GHz.

Little discloses the frequency generator (Gunnplexer) preset to 10 GHz (column 4, lines 50-53).

Therefore, it would have been obvious to a person of ordinary skill in the art to have a generator set to a frequency of 10 GHz, as taught by Little, in the measurement system of Fathi, in order to test the properties of the material responsive to the set frequency.

5. Claims 4 & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fathi in view of Dorothy et al., US 5,563,505.

Fathi discloses the thickness measurement system as applied to Claim 1 above.

Fathi does not disclose a suction assembly that applies pressure to the cavity resonator to retain it upon the measurement sample.

Dorothy discloses a suction assembly that applies pressure to the cavity resonator (180, opening of the resonator) to retain it upon the measurement sample (i.e. film), (column 9, lines 52-56).



Therefore, it would have been obvious to a person of ordinary skill in the art to use suction, as taught by Dorothy, in the measuring device of Fathi, in order to hold the sample in place.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fathi in view of Little, and further in view of the Electrical Engineering Dictionary (reference provided).

Fathi discloses the thickness measurement system as applied to Claim 11.

Fathi does not disclose a thickness measuring system, wherein the frequency signal generating means has Schottky diodes.

Little discloses a thickness measuring system, wherein the frequency signal generating means has a varactor. The Electrical Engineering Dictionary defines a varactor as comprising of Schottky diodes.

Therefore, it would have been obvious to a person of ordinary skill in the art to use a varactor comprising of a Schottky diode, as taught by Little, in the measurement system of Fathi, in order to tune the frequency generator, in the instant case a Gunnplexer.

7. Claims 22 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson , US 6,184,694, in view of Little Jr. and Fathi.

Anderson discloses a method for thickness measurement, comprising the steps of:

- abutting an open faced (see FIG. 3D) electromagnetic cavity resonator (**CV1**) to a sample having a film thickness (DRY FILM THICKNESS: FIG.3C);
- sweeping frequencies in the cavity resonator (see FIG. 6)
- determining the thickness of the film from a correlation of frequency to thickness (FIG. 6).

Anderson does not disclose:

- using a signal generator having a Gunnplexer;
- detecting a resonant frequency of the cavity resonator using a reflected energy detector; and
- determining the thickness of the film from a correlation of a shift of the resonant frequency.

Little discloses:

- using a signal generator having a Gunnplexer (column 4, lines 40-42);
- detecting a resonant frequency of the cavity resonator using a reflected energy detector (column 5, lines 17-19).

Fathi discloses determining the thickness of the film from a correlation (by **50**) of a shift of the resonant frequency (i.e. intrinsic shift, as described in column 4, lines 1-2).

Therefore, it would have been obvious to a person of ordinary skill in the art use a Gunnplexer, detecting a resonant frequency of the cavity resonator using a reflected energy detector, and determining the thickness of the film from a correlation of a shift of the resonant frequency, as taught by Little and Fathi, in the measurement system of Anderson, in order to

As per Claim 23, Anderson discloses the method of thickness measurement as applied to Claim 22 above, and further discloses the method wherein the correlation is based on a first order equation (see FIG. 6).

### ***Response to Arguments***

8. Applicant's arguments filed 08/01/2005 have been fully considered but they are not persuasive.

In response to applicant's arguments regarding the 102(b) rejection for independent claims 1 and 11, the examiner points out that the measurement system of Fathi meets the claimed limitations of claims 1 and 11. In particular Fathi discloses an electromagnetic cavity resonator (40) having an exposed side; the exposed side being the topside where the material, whose properties are to be tested, is deposited. Although the primary function of the Fathi reference is to detect the cure levels of materials, Fathi also includes a function of detecting "volumetric" properties of a material, as in column 4, lines 48-54, and density as in column 2, line 21. "Thickness" is understood to be a volumetric property. Further, Fathi discloses the cavity resonator use for detection of various properties including thickness, as in column 1, lines 41-44.

As per the reference of Little, the examiner points out that Little teaches the detection of thickness changes, as in the abstract, broadly interpreted as "thickness measurement" that is required by claims 3, 5, 7, 10, 12, 15, 17, and 19.

As per independent claim 22, the combination of Anderson, Little, and Fathi, teach the claimed limitations of claim 22. Although Anderson teaches the use of a reference cavity, only the measurement cavity is introduced to the sample material. Therefore, Anderson meets the claimed limitation of:

- abutting an open faced (see FIG. 3D) electromagnetic cavity resonator (**CV1**) to a sample having a film thickness (DRY FILM THICKNESS: FIG.3C);
- sweeping frequencies in the cavity resonator (see FIG. 6)
- determining the thickness of the film from a correlation of frequency to thickness (FIG. 6).

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marina Kramskaya whose telephone number is (571)272-2146. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571)272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**ANJAN DEB**  
**PRIMARY EXAMINER**

MK

Marina Kramskaya  
Examiner  
Art Unit 2858

